

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning on line 16 of page 6 and ending on line 22 of page 7 with the following amended paragraph:

“Figure 1 shows an optical assembly 10 which may be utilized for coupling an optical fiber 11 with an optoelectronic element 21 of package or housing 12. Housing or package 12 holding element 21 may fit into or onto a z-axis alignment sleeve 13. Alignment sleeve 13 may be secured to housing 12 with a weld or an adhesive. Or housing 12 and alignment sleeve 13 may be machined so that they may have threads about their inside and outside circumferences, respectively, and be screwed together. An alternative approach would be for sleeve 13 to be press fit to housing 12. Sleeve 13 may be slipped onto or in the end 14 of a metal barrel 15. Within sleeve 13 and barrel 15 may be an optical subassembly 16. Subassembly 16 may include a ball lens optical arrangement for focusing the sensing or emitting element 21 with an end 19 of optical fiber 11 at the center of the base of a ferrule 20. Alternatively, end 19 of optical fiber 11 may be configured like end 19' of optical fiber 11' extending out from ferrule 20', as shown in Figure 1A. Returning to Figure 1, the The optics of assembly 16 may include some other arrangement such as one incorporating an aspheric lens. A zirconia split sleeve 18 may be inserted in a portion 22 of barrel 15. Ferrule 20 may be inserted into split sleeve 18. Alignment sleeve 13 may be slipped into or onto portion 14 of barrel 15. The z-alignment of element 12 may be adjusted in terms of its distance from core end 19 of fiber 11 along the longitudinal or z axis 33 of assembly 10. Upon appropriate adjustment of sleeve 13 relative to portion 14 of barrel 15, sleeve 13 may be fixed to portion 14 with a weld or some other securing mechanism. It may instead involve a set of machined threads on sleeve 13 that fit a set of threads in portion 14. Then sleeve 13 may be screwed into portion 14 for the adjustment and securing of sleeve 13, housing 12 and optical assembly relative to barrel 15.

Please replace the paragraph beginning on line 1 of page 8 and ending on line 7 of page 9 with the following amended paragraph:

“Split sleeve 18 is a significant part of assembly 10 as it may provide for maintaining an x and a y alignment of fiber end 19 with device 21 of element 12. It may be the structure of split sleeve 18, the manner of mounting the split sleeve 18 and the way it holds ferrule 20 which may provide a virtually wiggle-free securing of ferrule 20 for the maintaining the alignment of fiber core end 19 with optoelectronic element 21 of housing or package 12. Split sleeve 18 may bias ferrule 20 to one side of the sleeve with a spring-like force on ferrule 20 to that side. Thus, if the ferrules 20 used in sleeve 18 vary somewhat in size or diameter, they may all be hold-able by sleeve 18 in a firm position or location relative to ~~the~~ sleeve 18. This tension of holding ferrule 20 in place may prevent wiggle of ferrule 20 in the optical coupler assembly 10 so long as sleeve 18 is firmly attached to portion 22 of barrel 15 or housing 20. The latter may be made of a metal. The inside diameter of split sleeve 18 may be slightly smaller than the outside diameter of ferrule 20. Thus, the stretching of sleeve 18 needed to allow the insertion of ferrule 20 in sleeve 18 may result in a spring tension on ferrule 20 by split sleeve 18. During the insertion of ferrule 20 into sleeve 18, slit 25 of sleeve 18 may become wider to accommodate a slightly larger ferrule inside of sleeve 18. Split sleeve 18 may be made from a zirconia ceramic material. This material may be exceptionally hard. It also may be dimensionally stable over temperature changes. The zirconia ceramic may be springy and may be precisely machined. Ferrule 20 may be made of the same material as that of sleeve 18. Thus the coefficients of thermal expansion of sleeve 18 and ferrule 20 may be approximately the same.”

Please replace the paragraph beginning on line 8 of page 9 and ending on line 17 of page 10 with the following amended paragraph:

“Figure 2 shows four views 18a, 18b, 18c and 18d of an illustrative example of zirconia split sleeve 18. View 18a is an end view of sleeve 18 that reveals the radii of an inside surface 23 and outside surface 24. There may be a slit or space 25 in sleeve 18 which amounts to about 15 degrees of the circumference of sleeve 18 and extends about the length of sleeve 18 as shown in view 18b. An example sleeve 18 may be ordered from Toto Ltd. in Japan at www.toto.co.jp. There may be two versions of the sleeve, that is a mini split sleeve and a standard split sleeve. The mini split sleeve may have an inside diameter from about 1.240 to about 1.245 mm and an outside diameter of about 1.6 to about 1.7 mm. This sleeve may have a length between about 5 and 7 mm. The slit width may be about 0.2 mm. The pull-out, withdrawal or extraction force may be between about 1 and 3 N for standard specification zirconia ferruled fibers. The standard split sleeve may have an inside diameter from about 2.490 to about 2.495 mm and an outside diameter of about 3.2 to about 3.4 mm. The sleeve may have a length between about 5 and 13 mm. The slit width may be about 0.5 mm. The pull-out, withdrawal or extraction force may be between about 2 and 6 N. On the surface of sleeve 18 directly opposite from slit 25 may be a metallization layer 26 on outer surface 24. Layer 26 may cover about 45 degrees of the circumference of surface 24 and be about the length of sleeve 18 as shown in view 18c. The thickness of metallization layer may be about 0.005 mm (0.0002 in.). View 18d shows sleeve 18 from the side with the metallization surface facing downward. The edges 27 of sleeve 18 may have a rounded outer edge and a beveled inside edge. The outside diameter of a mini ferrule may be about 1.25 mm and the standard ferrule may be about 1.5 2.5 mm. The diameter of the hole for fiber core 19 is about the size of the outside diameter of the fiber.”

Please replace the paragraph beginning on line 21 of page 10 and ending on line 21 of page 11 with the following amended paragraph:

“Figure 4 is a cross-section view at about the fiber core end 19 and looking at the end surface of ferrule 20. This Figure is not drawn to scale. Sleeve 18 may be secured and brazed to barrel 15 in portion 22 at metallization 26 area. As ferrule 20 is inserted into sleeve 18, it may flex, spring or stretch out sleeve 18 and slightly widen slit 25. Since sleeve 18 may tend to return to its original shape, tension may be maintained on ferrule 20 by sleeve 18 at points or surfaces 28 and 29 at about the inner edges of slit 25, and at point or surface 30 opposite of slit 25. The three places 28, 29 and 30 of contacts under pressure between sleeve 18 and ferrule 20 may firmly hold ferrule 20 in one position relative to sleeve 18 and barrel 15. Thus, there would appear to be no wiggle or movement, particularly in the x direction or axis 31 and the y direction or axis 32 (perpendicular to the longitudinal axis or z alignment direction 33) of ferrule 20 and fiber core 19 relative to sleeve 18, barrel 15 and optoelectronic element 21 in package 12. This may result in ~~the a~~ precise location of fiber core 19 ~~center of a pluggable device, on the tip or of~~ ferrule 20 after plug-in, which may ~~be actively~~ be aligned actively to element 21 and/or coupling optics appropriate to a design application. The achieved precise alignment may be retained. This coupling arrangement may be done in one and two dimensional arrays.”